Zero Retries issue 0054 2022-07-08

Zero Retries is a unique, quirky little highly independent, opinionated, self-published email newsletter about technological innovation in Amateur Radio, for a self-selecting niche audience, that's free (as in beer) to subscribe.

About Zero Retries

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Request To Send

Countdown to Digital Communications Conference 2022 - September 16-18, in Charlotte, North Carolina, USA (see below):
10 weeks…
Countdown to DCC 2022 Paper submission deadline - September 1:
~08 weeks…

Ahhhh… we've finally cleared the July 5th milestone that is the defacto start of consistent Summer weather here in the Pacific Northwet. (We had a cold snap a few days ago where I had to declare to my wife Tina to "put on a sweater - I'm *not* going to turn on the furnace in *July*".) The garage doors to the shop that houses N8GNJ Labs and the offices of "Zero Retries Enterprises" will now be open during the majority of daylight hours through the end of August and perhaps a bit into September.

Zero Retries made its debut with Zero Retries 0000 on Friday 2021-07-09. This little experiment has now lasted a full year of weekly issues, with ~~335~~ 337 of you along for the ride at the moment. Rereading ZR 0000, I think I've hewn reasonably well to the basics I outlined at the time. (For a bit more context, see the Zero Retries About page.)

I'm grateful to a few folks for their early (and ongoing) encouragement of Zero Retries - my wife Tina KD7WSF, daughter Merideth KK7BKI, stepmother Lois Stroh, and brother Mark Stroh have all been unfailingly encouraging, as well as friends Bill Vodall W7WNP, Larry Gadallah NM7A, Dan Romanchik KB6NU, Jeff Davis KE9V, Steve Lampereur KB9MWR, and Dewayne Hendricks WA8DZP. Martin Rothfield W6MRR was an early subscriber to Zero Retries, and has provided ample feedback.

For those that have directly interacted with me about enjoying (and more importantly, learning from) Zero Retries… ***Thanks!*** As I've mentioned, feedback is… sparse. I'm especially grateful to those that have sought me out in person to discuss Zero Retries, especially those special folks that sought me out at Hamvention 2022.

One regret is that I began Zero Retries after my Dad, Chuck Stroh, had passed on, so he didn't get to see it. I also miss my beloved little buddy, and Late Night Assistant Editor Jack Stroh who helped me begin Zero Retries, but didn't make it to this milestone.

A minor regret is that no one has yet come forward to provide some balance to my US worldview of technological innovation in Amateur Radio, especially all the technological innovation in Amateur Radio in Europe. It would be cool to see an equivalent of Zero Retries for Europe.

In ZR 0000, I explored but didn't execute on the idea of *a dash of Shameless Commerce*. I still have some plans along those lines, but rest assured that I remain rabidly committed that the content of Zero Retries will be accessible to all.

One thing I really got right in Zero Retries from the beginning was to highlight some of the (then, just beginning) transformative effect of Amateur Radio Digital Communications (ARDC)'s grantmaking within Amateur Radio. For those that haven't been following ARDC, they awarded ~$9M in grants in 2021 and 2022 grants are ongoing. If you think that not much has changed in Amateur Radio from those grants… perhaps not as a whole. But within the organizations who have received ARDC grants, they've been transformative. With prudent investing, ARDC has structured their endowment to be able to continue to award grants for, at minimum, for the medium term future.

Just one example of an ARDC grant that I believe will be transformative for Amateur Radio as a whole was to the Internet Archive for Building the Digital Library of Amateur Radio & Communication (DLARC). If that project works the way I hope it will, it will be transformative. Imagine if every Amateur Radio club newsletter, product brochures and manuals, old magazines long out of print, etc. all get scanned, organized, indexed, and made freely available. That will go a long way toward breaking the grip of the Amateur Radio Publishing Industrial Complex that locks a lot of good information about Amateur Radio behind paywalls. (No, I'm not suggesting that Internet Archive will violate copyright, but rather there will be a lot of information that is not currently available to the public that will be made available via the DLARC; think Packet Radio Magazine and Digital Digest, not CQ. *I* have a

lot of material queued up for donation to this project.

Disclaimer *- I'm a volunteer on ARDC's 2022 Grants Advisory Committee (GAC), but these views on ARDC are my own. When I write about ARDC grants, I only discuss grants and details that have been made public. I don't speak for ARDC, and they don't speak for me.*

There are two stories in this issue about High Frequency (HF) data communications. Two different approaches, and both make HF communications, using data, more usable and more reliable. It's getting to the point that, if you choose to communicate on HF via data modes - messaging, data file exchange, perhaps even digitized voice or images, use of HF is becoming utilitarian in a way that just isn't possible for voice or other analog modes. *Amateur Radio is a literally a license to experiment with radio technology!*

de Steve N8GNJ

Call for Papers: 2022 Digital Communications Conference

> Technical papers are solicited for the 41st Annual ARRL and TAPR Digital Communications Conference (DCC), September 16-18, 2022, in Charlotte, North Carolina. Papers will be published in the Conference Proceedings. Authors do not need to present at the conference to have their papers included in the Proceedings. Submit papers via e-mail to Maty Weinberg, KB1EIB (kb1eib@arrl.org) by September 1, 2022. Papers will be published exactly as submitted and authors will retain all rights.
>
> Conference papers will be distributed as pdf's to DCC attendees. Printed copies of the papers will be available for sale at Lulu (www.lulu.com).
>
> Paper and presentation topic areas include, but are *not limited* to software defined radio (SDR), digital voice, digital satellite communication, digital signal processing (DSP), HF digital modes, adapting IEEE 802.11 systems for Amateur Radio, Global Positioning System (GPS), Automatic Position Reporting System (APRS), Linux in Amateur Radio, AX.25 updates, Internet operability with Amateur Radio networks, TCP/IP networking over Amateur Radio, mesh and peer-to-peer wireless networking, emergency and homeland defense backup digital communications in Amateur Radio.

What TAPR's announcement doesn't say is that (in my experience, some from the inside of the process decades ago) pretty much every paper that's submitted is accepted, and despite the mention of *Technical papers*… that's not really a requirement. Operational stories are just as needed (and accepted), perhaps more so than technical papers, so people can see just *how* new technology and ideas are being *applied* to Amateur Radio. I co-authored a paper for DCC 2021 and it was a gratifying experience. I plan to do so again for DCC 2022, and my topic will probably be a capsule description of just how much technological innovation is happening in Amateur Radio.

Personal circumstances make it unlikely that I'll be able to attend DCC 2022, but I'll avidly follow it as much as much as possible, and I'll be one of the few that will order the DCC

Proceedings on paper for that satisfying feel of reading these new ideas on paper.

Image courtesy of WiMo Antennen und Elektronik GmbH, Inc.

PicoAPRS Transceiver v4

I really shouldn't be surprised that something like the PicoAPRS Transceiver v4 exists. I scaled down the above image to resemble the unit-in-hand images I've seen on Taner Schenker DB1NTO's Twitter feed; that is, it fits easily into one's palm with the antenna projecting just slightly from the palm. The list of features is amazing:

> The world's smallest APRS transceiver gets even better! With version 4, the small radio has grown up! As before, a TNC and a GPS receiver are included, but the functions of a 'real' VHF handheld radio are added: FM, PTT, memories, colour display and much more.
>
> The PicoAPRS V4 is a complete packet radio transceiver with built-in TNC for APRS. New features are the PTT button, microphone and loudspeaker - and all this without increasing the size of the housing much!
>
> The APRS function is certainly the most important and most used feature of the PicoAPRS. The transceiver can be used not only as an APRS tracker and receiver for APRS data, but also as a TNC for the computer. The KISS data protocol for packet radio is available in the new version 4 not only via the now side-mounted USB-C socket, but also via Bluetooth or Wifi! This makes it easy to set up an APRS IGate, which has never been possible in such a small housing!
>
> The WLAN interface also makes software maintenance much easier, because updates can now be installed much more conveniently via a built-in web server(!).

The same simple web interface allows convenient management of the memory channels and other functions.

The display has become larger and more colourful! With 240x240 pixels, incoming APRS packets such as position messages, APRS messages (similar to SMS) and status messages are displayed. For position messages, the distance and compass direction to the transmitter are also displayed. The last stations heard, including distance and compass direction, as well as messages received are stored and can be retrieved via the menu.

The GPS coordinates received via the built-in GPS receiver can be displayed and thus the Pico-APRS can also be used as a GPS tracker, e.g. for geocaching. If desired, one's own position can be permanently stored in the device, for example if no GPS position can be determined. The permanently stored position is then only used to display the distance and compass direction of stations received. A speedometer display is also available. The units of the speed display can be changed between km/h, mph and knots.

There are many other features. Projected price is €349.00 with Europe Value Added Tax, €293.28 (about $300) without VAT. Projected ship date is the end of 2022, initially only to European Union countries.

Amateur Radio / RNSS Coexistence in the 23cm Band

I knew little about this subject until I saw a reference to an excellent presentation slide deck by Barry Lewis G4SJH who is the IARU Lead on the 2023 World Administrative Radio Conference (WRC23).

Our Amateur Radio colleagues in International Amateur Radio Union (IARU) Region 1 (Africa, Europe, Middle East, and Northern Asia) are facing the loss of most privileges in the 1240 - 1300 MHz (23 cm) band. The primary allocation of this band (worldwide) is the Radio Navigation Satellite Service (RNSS), and Amateur Radio use of 1240 - 1300 MHz is secondary to RNSS. In Region 1, RNSS uses most of 1240 - 1300 MHz for the Galileo RNSS, and there is apparently significant potential for Amateur Radio operations to interfere with Galileo. One small excerpt from G4SJH's presentation (slide 13):

Implications for the 23cm band

- Removing the allocation is **outside the scope** of the WRC related work.
- But there **will be constraints** on large parts of the band for amateur and amateur satellite operation.

It's cold comfort that in Region 2 (North and South America), the US Department of Defense (DOD) Global Positioning System (GPS) doesn't (currently) use 1240 - 1300 MHz. But, just like GPS is usable worldwide, so is Galileo. "RNSS receivers" now routinely receive both GPS and Galileo signals for most accurate position determination. (Thus, it's no longer completely accurate to say "GPS receiver", as most such units make use of signals received from multiple

RNSS systems, typically GPS + Galileo). Thus when Galileo eventually becomes co-equal with GPS worldwide (if it hasn't already), it's likely that the same constraints on Amateur Radio use of 1240 - 1300 MHz in Region 1 will apply to Region 2 and Region 3 (Asia that's not covered by Region 1, and the Pacific). Remember that RNSS is primary for 1240 - 1300 MHz.

Note that besides GPS and Galileo, BeiDu (China) and GLONASS (Russia) are also intended to be global RNSS systems. The "Amateur Radio" 1240 - 1300 MHz band may get very crowded.

I guess I better get busy getting my three venerable Icom ID-1s on the air and have some fun with them while I still can.

LongChat - New QRP Digital Mode

Oguz Tanrisever TA2STO on eHam.net on 2022-02-14:

> I have developed a new chirp based text chat application. Specifications: 7 chars/sec, SNR: -12db , Eb/No = 5 db. Currently I have tested it with IC7300, FT991a and IC705. It's performance seems to be much better than other comparable modes like PSK31, RTTY. etc. I need help for testing with other radio models. Please let me know the radio model you have and I will include it in the radio list for your tests. You may download the software, brief info and the user manual at the link below:
> https://drive.google.com/drive/folders/1G5DnKJXxJhi33GzugZ-eHWpfGYjEVhSI?usp=sharing
> LongChat can be tested with only one radio and PC by enabling the "rx while Tx" option in the setup menu. Thanks in advance for your support in testing.

As I keep saying… technological innovation in Amateur Radio *is happening*! Sometimes you find it in odd corners, like eHam.net.

I've just recently starting trying to monitor eHam.net. I'm sad that TA2STO's announcement of LongChat was met with… "less than enthusiasm" which is a shame. I'm highlighting LongChat here because innovation like this *should be encouraged*, not discouraged. I've reached out to TA2STO and hopefully I (or he) will write about LongChat's progress since his announcement.

Codec 2 HF Data Modes

Speaking of HF Data Modes, the prolific David Rowe VK5DGR started yet another project in 2020 to use the (open source, of course) CODEC 2 technology to transfer data rather than voice.

I've taken an interest in open source HF data modems. So I've been busy refactoring the Codec 2 OFDM modem for use with HF data. The major change is from streaming small (28 bit) voice frames to longer (few hundred byte) packets of data.

…

It works! I've spent the last few weeks building automated tests for the new HF data modes. All three modes are working well over real world 40m/20m channels at distances between 100km and 3000km. My goals were:

- *Transfer a total 1 Mbyte of data – that's quite a bit for HF.*
- *Find some fast fading and long delay spread channels. Hence the 100km (NVIS) tests.*
- *Run the tests over a week to experience a range of HF conditions.*
- *Look for any corner cases that break the modems.*
- *Collect a bunch of real world samples to support further development.*

VK5DGR is working on the enabling technology rather than create a new mode (equivalent to a "TNC") such as Pactor. See Part 1, Part 2, and Part 3 for the whole story.

In addition to VK5DGR's work, FreeDATA is a somewhat similar project by Simon Lang DJ2LS to also use CODEC 2's technology to exchange messages and data.

ZR > BEACON

- **Reminder - Overview of the latest AREDN software release**
  (via the AREDN@groups.io mailing list) On Saturday 2022-07-09 @ 09:00 Pacific, Orv Beach W6BI will give a Zoom presentation on the changes and improvements in the latest AREDN production release (and follow-on nightly builds). Originally intended for the ARES LAX (Los Angeles) Northeast Group, Oliver, K6OLI has graciously permitted W6BI to invite others to join if they like. Zoom info:
  https://usc.zoom.us/j/93097875597?pwd=a0trR1BPczRhTDFmaTR0QldOZlRLQT09
  Meeting ID: 930 9787 5597
  Passcode: Me&Julio

- QSO Today Virtual Ham Expo - Call for Amateur Radio Speakers for 2022-09-17 and 18. *… calling for international speakers on any amateur radio subject*. This is a good event, but they made an unfortunate choice of dates to overlap with the 2022 DCC.

- A Tech Millionaire Bought a Giant Cold War Radar to 'Find UFOs - *A British tech entrepreneur posted on Reddit looking for help getting a Cold War era nuclear early warning radar dish to spin again.*
  I love stories like this of millionaires and billionaires tackling arcane technical projects simply they're interested, and they have the resources to make it happen. My favorite example is Microsoft cofounder Paul Allen creating the Living Computers Museum in Seattle, hiring a talented staff, and providing them all the resources they needed to revive and showcase these old computers.

- For the few of you that might not have heard, Raspberry Pi has created a new version of

their Raspberry Pi Pico embedded computer - the Pico W - that adds (2.4 GHz) Wi-Fi wireless connectivity. The wireless chip used is also capable of Bluetooth, but that option is currently not enabled. The list price for the Raspberry Pi Pico is $4, and the Pico W is $6. There's some temptation to ignore the Pico in favor of the more established Arduino, but the Pico / Pico W is powerful enough to run a web server. A $6 web server… *that's* Zero Retries Interesting!

Join the *Fun* on Amateur Radio

If you're not yet licensed as an Amateur Radio Operator, and would like to join the fun by *literally having a license to experiment with radio technology*, check out
Join the Fun on Amateur Radio for some pointers.

Closing the Channel

In its mission to highlight technological innovation in Amateur Radio, promote Amateur Radio to techies as a literal license to experiment with wireless technology, and make Amateur Radio more relevant to society in the 2020s and beyond, Zero Retries is published via email and web, and is available to anyone at no cost. Zero Retries is proud *not to participate* in the Amateur Radio Publishing Industrial Complex, which hides Amateur Radio content behind paywalls.

My ongoing ***Thanks*** to:

- Tina Stroh KD7WSF for, well, *everything!*
- Pseudostaffer Dan Romanchik KB6NU for continuing to spot, and write about "Zero Retries Interesting" items on his blog that I don't spot on my own.
- Southgate Amateur Radio News consistently surfaces "Zero Retries Interesting" stories.
- The Substack email publishing platform makes Zero Retries possible. I recommend it for publishing newsletters.

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More bits from Steve Stroh N8GNJ:

- SuperPacket blog - *Discussing new generations of Amateur Radio Data Communications - beyond Packet Radio (a precursor to Zero Retries)*
- N8GNJ blog - *Amateur Radio Station N8GNJ and the mad science experiments at N8GNJ Labs - Bellingham, Washington, USA*

Thanks for reading!
Steve Stroh N8GNJ / WRPS598 (He / Him / His)
These bits were handcrafted in beautiful Bellingham, Washington, USA
2022-07-08

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